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**Inter-firm dependency and employment inequalities :
Theoretical hypotheses and empirical tests**

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Bruno TINEL, Julie VALENTIN

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Inter-firm dependency and employment inequalities:

Theoretical hypotheses and empirical tests

Corinne Perraudin[^], Héloïse Petit[^], Nadine Thèvenot^{*}, Bruno Tinel^{*} and Julie Valentin^{*}

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This article highlights the importance of power relations in inter-firm relations and analyses their impact on firms' employment management practices. We show, firstly, that the use of subcontracting creates a chain of inter-firm economic dependency because it leads the principal contractor to plan and control the activities of the subcontractors. We then advance the hypothesis that this chain of dependency influences both the skill structure and wage levels. Empirical tests carried out on French data confirm that firms that subcontract outsource execution tasks and that the hierarchy of firms impacts employees' wage levels.

Dépendance interentreprises et inégalités d'emploi

Cet article met l'accent sur le poids des rapports de force dans les relations interentreprises et analyse leur incidence sur la gestion de l'emploi. Nous montrons tout d'abord que le recours à la sous-traitance, parce qu'il conduit les donneurs d'ordres à planifier et contrôler l'activité des sous-traitants, crée une chaîne de dépendance économique interentreprises. Nous formulons ensuite l'hypothèse que cette chaîne de dépendance influence la structure des qualifications d'une part et le niveau des rémunérations d'autre part. Des tests empiriques menés sur le cas français viennent confirmer que les entreprises qui sous-traitent externalisent le travail d'exécution et que la hiérarchie des entreprises se répercute sur les niveaux de rémunérations versées aux salariés.

Key words: subcontracting, skills, wages, power relation.

Mots clés : sous-traitance, qualifications, salaires, pouvoir, rapport de force.

JEL classification: L24, J82, J31

[^] Centre d'études de l'emploi (CEE) and Matisse-CES, Université Paris 1. Corinne.Perraudin@cee-recherche.fr, Heloise.Petit@cee-recherche.fr

^{*} Matisse-CES, Université Paris 1. Nadine.Thevenot@univ-paris1.fr, Bruno.Tinel@univ-paris1.fr, Julie.Valentin@univ-paris1.fr

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1. Introduction

Since the beginning of the 1980s, firms have been adopting external growth strategies combined with vertical disintegration processes, whereby activities previously carried out within vertically integrated firms are externalised (Feenstra, 1998, Thèvenot and Valentin, 2005 and Valentin, 2006). The spread of subcontracting has led to a proliferation of situations of economic and financial dependency in inter-firm relations and changed the nature of the employment relationship. It is no longer possible to interpret it as a bilateral relationship between employers and employees, since employers are themselves part of hierarchised networks of inter-firm relations.

Analysis of the influence of inter-firm relations on employment has been developed in recent years by studies of modes of governance in international production chains (Gereffi, Humphrey and Sturgeon, 2005; Altenburg, 2006) and of the impact of international subcontracting on employment and wage levels (Feenstra and Hanson, 1996; Epstein, 2006; Hijzen and Swaim, 2007; Houseman, 2007). The focus on international production chains is justified by the globalisation of economic exchanges over the past 30 years. However, we argue that it is equally true that the problem is also a critical one in national production chains. Consequently, we have decided to examine the impact of inter-firm relations on the management of employment within a single country in order to bring out more clearly the differences in employment management practices between firms depending on their position in the subcontracting relationships. The second original aspect of our study is that it is based on a statistical analysis of subcontracting relationships and employment management practices, whereas most of the existing studies, when they include an empirical analysis, draw on case studies.

The aim of the article is to show that subcontracting relationships are reflected in hierarchical relationships between firms and that the power relations thus formed impact on firms' mode of employment management. Exploration of the literature on governance

structures in subcontracting relations leads us, firstly, to adopt a theoretical perspective that emphasises the central role that power relations play in this type of inter-firm relations. Secondly, we formulate two types of hypotheses linking the inter-firm dependency relationships to particular modes of labour mobilisation within firms.

The first concerns the homogeneity (or otherwise) of skill structures across firms. We oppose two approaches. The first is based on the notion of division of labour. In this approach, increased use of subcontracting might be expected to result in the skills associated with supervisory and monitoring tasks being concentrated in the principal contractors, with execution tasks being located in the subcontracting firms. In the second, firms are assumed to be refocusing on their core businesses and this, it is argued, would be neutral with regard to the skill structure across firms.

The second hypothesis concerns the link between inter-firm dependency and the level of the wages paid by firms. The hierarchised representation of the productive system suggests that the use of subcontracting can be regarded as an indirect form of labour mobilisation that enables principal contractors to have a workforce at their disposal when required without having to commit themselves to a long-term employment relationship. Our aim here is to consider the consequences in terms of pay for the workers hired by the subcontractors. The hypothesis tested will be that the wages paid in subcontracting companies are lower than those paid by principal contractors.

These theoretical hypotheses are tested empirically using data for France, where the use of subcontracting is now very common behaviour. In 2004, 55% of establishments with 20 or more employees in the non-agricultural market sector stated they had used one or more firms to carry out part of their activity. We use employer-employee matched data that combine the 2004-2005 REPOSE survey carried out by DARES (*Direction de l'Animation de la Recherche, des Etudes et des Statistiques*, a department of the Ministry of Labour) and the 2005 annual social data declarations (*Déclarations Annuelles de Données*

Sociales/DADS), which are collected by INSEE, the French national statistical office. The REPOSE survey provides detailed information on establishments' employment management practices and commercial strategies. It is one of the few French data sources that provide data on subcontracting behaviour regardless of sector. It is based on a sample of 2930 establishments with 20 or more employees that is representative of the non-agricultural market sector as a whole. The DADS are an administrative (and therefore exhaustive) source that provides detailed information, notably on skill structures and pay levels by establishment. Thus pairing these two data sources provides us with information on subcontracting, pay policy and on the characteristics of the work force in terms of skills, as well as on various characteristics of establishments.

The remainder of the article is structured as follows. We begin by characterising the hierarchical nature of inter-firm dependency relations and highlight its impact on employment relationships (section 2). We then formulate two alternative hypotheses on the consequences of these hierarchical relations for the skill structure, which we subject to an empirical test (section 3). Finally, we analyse how this hierarchical productive system influences employees' pay (section 4).

2. Subcontracting relationships and a hierarchical productive system

Having identified the sources of principal contractors' dominance over their subcontractors and illustrated the hierarchical structure of the productive system that results from this in France, we will analyse the consequences for employment relationships.

2.1 Subcontracting relationships as dependency relationships

The question of the dependency relations inherent in subcontracting relation was already being discussed in some studies published in the 1950s to 1970s (Houssiaux,

1957a; Blois, 1972). These studies describe situations of ‘vertical quasi-integration’¹ in which ‘some firms are gaining the advantages of vertical integration without assuming the risks or rigidity of ownership – a situation which might be described as ‘vertical quasi-integration’ (Blois, 1972, p. 253). As early as the 1950s, notably in the studies by Houssiaux, the use of subcontracting was being analysed in the context of firms’ strategies of expansion through integration or diversification. Compared with internal growth, whereby firms invest in new plant and equipment, and ‘direct’ external growth, when firms take over others, subcontracting was defined by Houssiaux (1957a) as an ‘indirect method of external integration’ that made it possible to limit investment costs and reduce the risks of excess production capacities, while at the same time strengthening ‘large firms’ power to dominate’ (p. 405). This power to dominate subcontractors was similar to a monopoly power, which gave dominant firms the power to incorporate subcontractors (Bain, 1956), to switch from one to another or to enter into competition with them by developing the activity in question in house. Consequently, they enjoyed considerable bargaining power when contracts came up for renewal, enabling them to force down prices and increase their profits. Houssiaux urges that consideration be given to the consequences of subcontracting for firms’ growth potential and the degree of concentration in the industries affected even though he emphasises that subcontracting can be used to outsource labour as part of an anti-union strategy (see below). Growth through subcontracting enabled firms to form ‘groups’ (which today would be called ‘networks’) and thereby extend their dominance, not simply financially but technologically as well.

Sacchetti and Sugden (2003), contrary to the analytical framework based on transaction cost theory, in which power rests on the distribution of property rights and is

¹ To the best of our knowledge, the term quasi-integration was popularised by Blois in 1972, but it was first the subject of intensive theorisation by Houssiaux in 1957a. It had already been used, incidentally, by Bain (1956, p. 342) in a paper on industrial concentration and, particularly, by Kohls and Wiley in 1955, who used it to describe the organisation of the broiler industry in the USA.

regarded as a case of market failure, consider power as a constituent element of network relations. Following Richardson (1972), who highlighted the division of labour in production networks, the power in inter-firm relations is derived from the ability of certain firms to plan in advance the activities of other, legally independent firms. More specifically, in seeking to identify who takes the strategic decisions, who determines the network's objectives and how conflicts are resolved, Sacchetti and Sugden propose that subcontracting relations should be represented as 'networks of direction', in which power is concentrated in the hands of the principal contractor. The use of subcontracting implies, by definition, an asymmetry of position, regardless of the mutual benefits that both parties may enjoy, since a subcontracting relationship allocates specific rights of control to the principal contractor. The representation proposed by Sacchetti and Sugden (2003) is pyramid-shaped, with the summit of the hierarchy represented by a core firm in which power over strategic questions is concentrated. This firm enters into long-term contracts with a small number of large subcontractors that may have some bargaining power, in view of their market positions and production technologies. The further down the pyramid one goes, the more the number of subcontractors increases; this enables the core firm to make them compete with each other in order to exploit profit sources. Thus the bottom of the pyramid is made up of production units that are very dependent on the principal contractor (sweatshops) and in which working conditions and pay are particularly poor.

This hierarchical representation of production relations helps to explain inter-firm forms of dependency. It stands in opposition to 'mutual dependency networks' (Powell, 1990), in which power is distributed among the firms in a network, each of which is able to exert some influence over the development of the network's policies and objectives. Sacchetti and Sugden (2003) stress that subcontracting in the automotive industry is not based on this type of network. This is also the conclusion that can be drawn from Gorgeu and Mathieu's study (2005) of the French automotive industry. The hierarchical approach also marks a break

with studies describing hybrid modes of governance, such as those by Diamantopoulos (1987) on relative rather than absolute dependency, or studies of governance structures in international production chains that focus on the spread of hybrid situations located at various points on a spectrum between pure dependency and relationships based on equality (Gereffi, Humphrey and Sturgeon, 2005; Altenburg, 2006).

In a hierarchised structure, first-rank subcontractors may have a certain degree of bargaining power (derived in particular from their technology or market position), which they can use to negotiate long-term contracts. However, the influence these subcontractors can exert is limited to solving particular problems linked to the production and technological specifications of the goods they are to produce. What gives the networks their hierarchical structure is the concentration of managerial and controlling power over their strategic decisions and objectives, which ultimately rests in the hands of the core firm. Thus subcontracting is a ‘segmented form of productive organisation’, to quote Vennin (1975), that involves dominance relations since, in contrast to intermediate consumption, the goods produced as part of a subcontracting relationship contribute to the production of a collective product which the principal contractor controls and for which he therefore has the ultimate economic responsibility.

The dependency between subcontractors and principal contractors is, moreover, very evident in publications issued by the public authorities. As early as the mid-1970s in France, before the first subcontract act was passed in 1975, a report by the economic and social council defined subcontracting as follows: ‘a transaction in which one firm entrusts another with the task of carrying out on its behalf and in accordance with a pre-established set of specifications part of the work required to produce the goods or services for which it retains ultimate economic responsibility’ (*Conseil économique et social*, report of 21 March 1973). Incidentally, it is this definition that serves as a basis for the *Agence française de normalisation* (AFNOR), the French national standards agency.

Ultimately, the specific characteristic of a subcontracting relationship is the economic or monetary dependency that is created by two complementary aspects:

- Upstream of the production process, the subcontractor's activities are defined ('planned') both qualitatively and quantitatively by the principal contractor. As a result, the subcontractor becomes economically or financially dependent on the principal contractor, since he does not begin production without an order from the principal.
- Downstream of the production process, the subcontractor is in possession of a semi-finished product that cannot be redeployed on the market independently of the principal contractor. To put it another way, the subcontractor does not have the ultimate economic responsibility for the fragmented product, which is controlled by the principal contractor. Thus this aspect also gives rise to economic or monetary dependency on the part of the subcontractor, since the fragmented product is intended solely for the principal contractor, who will combine it with others in order to create a marketable product. As a result, the subcontractor has no control over the sale of his product².

Thus inter-firm networks are structured hierarchically on several levels and more or less loosely depending on the forms of inter-firm dependency, a firm being all the more dependent on its client the greater the share of its turnover that client accounts for. Since organisations differ in status and, consequently, in bargaining power, the gains are not distributed equally within the network of organisations. This situation is illustrated by the study by Perraudin *et al.* (2006) and Tinel *et al.* (2007), which highlights the differences in firms' profitability depending on their position in the hierarchised structure.

2.2 An empirical presentation of the hierarchy of the French productive system based on the 2004-2005 REPONSE survey

² This is similar to the old *putting out system*, in which a principal contractor positions himself between the market and the producer in order to combine the latter's output with others and sell the 'collective product' in the market (Marglin, 1974).

The hierarchical nature of inter-firm relations can be characterised in terms of the economic dependency resulting from the fact of being either a subcontractor or principal contractor. The database on which the present article draws provides information on inter-firm economic dependency through the use of two declarative questions: (i) does the establishment declare itself to be a subcontractor? (ii) does the establishment declare that it engages in subcontracting?

The answers to these two questions can be used to identify not only inter-firm dependency resulting from the position of dominance exploited by principal contractors but also ‘cascade’ subcontracting (Appay, 1998), a term used to describe situations in which subcontractor companies that are economically dependent on the principal contractor can offload some of the constraints to which they are subject on to other firms.

It is on this basis that a hierarchised chain of subcontracting relations is described. The ‘pure principal contractors’, i.e. establishments that act only as principal contractors and are not themselves dependent on another principal contractor, constitute the upper level of this inter-firm hierarchy. The intermediate level is made up of establishments which, while being subcontractors, are at the same time principal contractors and are thus in a position to transfer some of the constraints resulting from their commercial relations with their principal contractors on to their subcontractors. The final level consists of establishments that are solely subcontractors. These three categories of establishments are investigated in parallel to establishments that are not involved in any subcontracting relationships; they are neither principal contractors nor subcontractors. Taking into account all sectors and all sizes of establishment, the distribution of establishments by their dependency relations is shown in Table 1, while the differences between sectors and establishment sizes are shown in Tables 2 and 3.

Insert Table 2

Insert Table 3

2.3 The consequences of the hierarchised productive system for management of the employment relationship

In his pioneering economic analysis, Houssiaux (1957b) noted that subcontracting constituted a risk for workers, since subcontracting firms frequently do not fully comply with the legislation: non-compliance with production and safety standards, significant use of clandestine labour, etc. Furthermore, Houssiaux emphasises the fact that the workers hired by subcontractor firms are generally less unionised and are subject to greater anti-union pressures than employees in the large firm. The legally instituted absence of employee representatives and of works councils in firms with fewer than 50 employees (which is still true today) is an incentive to maintain small firms, in which the employer's authority can go unchallenged. Thus workers in subcontracting firms are less well protected and the employer's authority is less disputed. Even in this period, Houssiaux mentions the concerns of the major trade union federations about the risks of social dumping associated with the development of subcontracting. Putting forward a hypothesis that differs from the technico-economic arguments deployed hitherto in his analysis, Houssiaux writes these significant lines, which undoubtedly reflect more what was to happen on a larger scale two or three decades later: 'This difference [between the social guarantees in subcontractor firms and large integrated firms] explains why some firms can pursue quasi-integration: a large firm wants to replace such an integrated workshop that is particularly difficult to manage with a subcontractor; the ringleaders are dismissed and the other workers are divided up among other workshops' (Houssiaux, 1957b, p. 406).

Some recent studies also highlight the impact of inter-firm relations on the management of employment. Barrett and Rainnie (2002), for example, differentiate employment conditions in small firms according to whether they are dependent on a large

firm for their activities as part of a subcontracting relationship, in competition with large firms or operating in isolation because they are positioned in geographic or product niches. Grimshaw and Rubery (2005) observe that analysis of the employment relationship has to take account of inter-firm relations: 'To understand the tensions and pressures on the internal employment relationship there is a clear need to locate this relationship within the web of business-to-business production relationships as well as in the system of inter-capitalist competition' (Grimshaw and Rubery, 2005, p. 1038).

Grimshaw and Rubery (2005) note that the outsourcing of certain activities 'may reflect a desire to escape internal constraints that arise out of the very high trust relations on which the internal compromise is based' (Grimshaw and Rubery, 2005, p. 1030). In cases in which normal cooperative practices prove insufficient to call into question the previous arrangements, employers may resort to threatening to use external labour in order to reconfigure the internal compromises. According to these authors, the processes of externalisation and fragmentation serve as instruments to be used by employers seeking to change the power relations within their firms. Moreover, the use of external workers in itself enables employers to mobilise labour at reduced cost.

Grimshaw and Rubery stress that an employer can exert control over a workforce located outside the immediate boundaries of his own organisation, which requires inter-firm cooperative networks to be structured and hierarchised to that end. Thus a firm can seek to control and motivate the workers who, in legal terms, are employed by its suppliers. In other words, some elements of the organisation of the production process that used to be analysed solely in terms of the internal employment relationship extend in reality beyond the firm's legal boundaries.

Consequently, the distinction between employers, who have control over the workforce directly under their authority, and principal contractors, who are limited to exchanges of goods, is not relevant. This interlocking of organisations, with one firm exerting

more or less direct control over the workforce of another, is not limited to a single level, since a firm that is dependent to a greater or lesser extent on its client will also be a client of one or more other firms.

Ultimately, the chain of subcontracting relations is constructed around a hierarchy of inter-firm relations, in which the dominant firms are able to influence the management of employment beyond their own boundaries. The principal contractor's dominance has many consequences for the management of employment in the subcontractor firms. We will examine two of them, which are directly linked to the inter-firm dependency relationship, namely the power to structure the inter-firm division of labour and hence to determine the categories of workers hired by all the firms involved and the power to influence pay levels in the dependent firms.

3. The consequences of a hierarchised productive system for the skill structure

Subcontracting relations influence the distribution of tasks between firms and consequently may alter the skill structure in individual firms. In order to clarify this link between the inter-firm division of labour and the skill structure, it would seem advantageous to examine the issues at stake in the current trend towards increased use of subcontracting with reference to the processes of integration and disintegration that have punctuated the history of advanced capitalist economies over the past century. An empirical test is proposed in order to decide between two alternative approaches to describing the impact of the use of subcontracting on the inter-firm division of labour and hence on the skill structure.

3.1 Integration and skill structure

Following the classic studies by Chandler, the prototype of the modern industrial firm was defined by the large-scale industrial enterprises that contributed to the development of

managerial capitalism³. Multifunctional firms began to emerge from the end of the 19th century onwards; as they grew considerably in size, they began to adopt a multidivisional structure. In order to achieve much lower unit costs than those of the smaller firms that had existed hitherto, they made extensive use of the most advanced production technologies, with which they were able to achieve very high production volumes. These large firms proceeded to invest in very large-scale production plants that enabled them to exploit to hitherto unequalled levels the economies of scale and scope offered by the technology. Considerable investment was also channelled into national and international distribution and marketing networks in order to bring sales volumes into line with output. These giant firms were able to function and grow because such investment was accompanied by the rapid expansion of managerial personnel, who were specially recruited and trained to administer the enlarged production facilities and the increase in personnel working in production and distribution, as well as to monitor and coordinate these two basic functional activities and to plan and allocate resources for future activities.

As far as work organisation and the division of labour were concerned, managerial firms put into practice systematically and on a large scale Taylor's principles of scientific management. Conception was separated from execution and execution was itself broken down into basic tasks depending on the requirements imposed by the technology in use. These principles of task fragmentation and specialisation were applied not only to production on the shop floor but, as managerial firms grew, to distribution functions, R&D and even managerial functions themselves. This gave rise in turn to an extremely hierarchised organisation. The most vital conception functions, such as strategic planning, finance and accounts, some R&D activities and marketing, were answerable directly to the top of the hierarchy. On the other

³ Cf. Chandler (1977) and (1990), or even Simon (1947) and Penrose (1959).

hand, the most routine execution functions were allocated to relatively autonomous operational units that reproduced the general organisational structure on a miniature scale⁴.

As far as the organisational structure by skill in large-scale integrated firms is concerned, the most highly skilled jobs were concentrated in the departments specialising in conception functions, which were closest to the managerial department. At the other extreme, the least skilled jobs, which were increasingly broken down into an ever smaller number of execution tasks, were concentrated in the operational units; these units also contained a certain number of skilled jobs, which were required for managerial and supervisory purposes. Although they were relatively independent in accounting and managerial terms, these operational units remained dependent on decisions taken at the top of the company: they did not act on their own account but rather put into practice plans drawn up by senior management.

3.2 Disintegration and the skill structure: theoretical hypotheses

The swing of the pendulum that has been evident for several decades (disintegration and reduction in company size) certainly cannot be reduced to the rise of subcontracting⁵ observed in most of the advanced capitalist countries. At the same time, the concomitance of these two phenomena can hardly be ignored either. The increased use of subcontracting can be considered as one of the factors that have been driving the disintegration of the integrated managerial firm, described in 'canonical' fashion above. There are several approaches that could serve as a basis for analysing its impact in terms of skill structures. In particular, two competing explanations seem to us of interest. The underlying assumption in the first is that

⁴ They had their own accounting, production, purchasing, sales, personnel management departments, etc.

⁵ In reality, subcontracting already existed in the managerial era, but it seemed to be so closely linked to the rapid development of the large, multi-divisional firm that, in the 1950s, some authors made subcontracting one of the methods by which large integrated firms expanded by referring to it as 'quasi-integration' (Houssiaux, 1957b). Cf. above.

firms are seeking to refocus on their core business, while in the second the driving factor is the division of labour based on skill structure.

In the first approach ('refocusing on core business'), firms are assumed to be outsourcing entire activities, from conception to execution, in order to obtain specialisation gains. These outsourced activities are regarded by managers as secondary to other activities they regard as essential. From the point of view of the skill structure, if this hypothesis is to be verified, the operation must be neutral overall, since outsourcing an entire activity means that conception and execution tasks will be subcontracted together, which will not alter the firms' skill structure relative to that of the large, integrated, multi-divisional company.

On the other hand, in an approach based on a division of labour in which planning tasks are separated from operational tasks, we have seen that skilled employees tend to be in charge of conception tasks while the unskilled workers are restricted to execution tasks. In this framework, the workers who specialise in execution tasks, however fragmented they may be, have to be supervised. This supervisory and control work is carried out by skilled workers and is supplementary to the execution work. Here, therefore, it is possible to envisage certain organisations specialising in conception tasks and hence employing a higher share of skilled workers. On the other hand, the externalised production units will, as a result of the subcontracting, specialise in execution tasks and will therefore employ a higher share of unskilled workers⁶, although there will be some skilled workers because of the need for supervision imposed by the fragmented specialisation. In formal terms, the emergence of subcontracting from an initial situation in which firms are integrated leads to the establishment of several legally separate production units, which specialise in different segments of the production process. In reality, these firms are neither independent of each other nor operating on equal terms: some specialise in implementing a set of specifications

⁶ This mechanism undoubtedly has an impact at international level on the less advanced industrialised countries to which some of the subcontracting is directed, which may in turn give rise to increased demand for unskilled labour (*cf.* Sayeed and Balakrishnan, 2002).

drawn up by the principal contractor and are dependent on it. Consequently, in this second approach to disintegration through subcontracting, in which firms are structured into a hierarchy, the outsourcing has an impact on the skill structure that is not neutral: the subcontracting firms employ higher shares of unskilled workers.

3.3 Inter-firm dependency and skill structure: empirical test

At this point, the two theoretical approaches outlined above will be compared empirically, by examining the homogeneity (or otherwise) of the skill structure in firms depending on their position in the inter-firm hierarchy. Pairing the REPONSE survey with data from the 2005 annual social data declarations (DADS, Insee) provides information on firms' position in the subcontracting relationship and on the share of employees in each firm in each of three skill levels: manual workers and unskilled white-collar employees, skilled manual and white-collar workers⁷ and highly skilled employees (managers and supervisors, technicians and professionals).

In order to empirically test the relevance of the two hypotheses to the French case, we estimate the share of employees by skill level and test whether it varies depending on the firm's position in the chain of dependency relations defined above. For each of the three categories of skill levels, the share of employees is estimated with a Tobit model, since some establishments do not have any employees in one of the skill levels. The influence of the inter-firm hierarchy on the distribution by skill level is estimated, with the effects of structural variables (sector of activity, size and age of establishment, company turnover and workforce composition by gender and age of employees) being controlled for. The impact of being a principal contractor, a subcontractor or both is estimated by comparison with the situation of a firm with no specific commercial relation.

⁷ The classification of manual workers as 'unskilled manual workers' and 'skilled manual workers' exists in the French nomenclature, in contrast to the classification for white-collar workers. The distinction between unskilled and skilled white-collar workers is taken from Burnod and Chenu (2001).

The results of the estimations are shown in Table 4. They favour an approach based on division of labour rather than a return to firms' core businesses: the skill structure is significantly different all along the inter-firm hierarchy. The share of unskilled workers is all the greater the lower a firm is positioned in the inter-firm hierarchy (that is the more it operates as a subcontractor) and all the lower the more a firm dominates the others in its network. The situation of establishments in intermediate situations (those who are subcontractor and principal contractor at the same time) is not specific. Yet, the share of skilled manual and white collar workers is particularly high in these establishments as for 'pure' subcontractors. On the other hand, the share of highly skilled employees stands out in 'pure' subcontractor firms: it is significantly lower for subcontractors than for others. In this regard, firms in intermediate positions or at the top of the hierarchy are not significantly different from those that have no involvement in subcontracting.

Thus the inter-firm dependency that arises out of the subcontracting relationship influences firms' skill structures. Our results are coherent with the hypothesis that the use of subcontracting leads to a transfer of the least skilled workers to the most dependent firms in the productive system hierarchy. The inter-firm division of labour appears to be linked to inter-firm relations. We turn now to an examination of the wage practices to which this externalised workforce is subject.

Insert Table 4

4. The consequences of productive system hierarchisation for wage practices

The purpose of this section is to examine the effects of this hierarchisation of the productive system on workers' pay. Our investigation has two aims. The first is to identify the consequences of the transfers of labour along the dependency chain for the wages paid to the

workers displaced in this way, the second to formulate a hypothesis on one of the possible explanations for this process of externalising the least skilled workers.

4.1 Subcontracting and wages: theoretical hypotheses

In their studies, Houssiaux (1957b) and Grimshaw and Rubery (2005) emphasise that the use of subcontracting can be regarded as a means of mobilising a cheaper workforce. In fact, savings in labour costs in terms of wages, health insurance and pension benefits are one of the most frequently mentioned factors determining the use of subcontracting (Abraham and Taylor, 1996; Houseman, 2001; Gramm and Schnell, 2001). This hypothesis is usually couched in terms of efficiency wage, in the version of the theory based on norms of fairness (Akerlof and Yellen, 1990). These norms prevent firms from paying different rates to permanent and temporary workers, and subcontracting is interpreted as a means of circumventing them. In all these studies, the econometric analysis, which draws on American data, involves investigating whether pay levels in the firms in question explain the use of flexible staffing arrangements. The expected link is positive: the higher the wages firms offer their employees (those they employ directly), the greater incentive they will have to use subcontracting. The results obtained partially corroborate this hypothesis. The study by Abraham and Taylor (1996), which draws on data derived from a supplementary questionnaire in the Industry Wage Survey (IWS) carried out in the manufacturing sector in 1986 and 1987, shows that contracting for janitorial services (i.e. the least skilled service activities) is primarily a response to a need to reduce hourly labour costs. Houseman (2001), who draws on the 1995, 1997 and 1999 Current Population Survey Supplement on Contingent and Alternative Work Arrangements, finds that benefits variables have a positive and significant influence on the use of flexible staffing arrangements, except for contract workers. Gramm and Schnell (2001), using data from their own 1994-96 survey of human resource managers in Alabama establishments, find that the probability of using subcontracting is

positively linked to the wages of core employees relative to those of other similar workers in the industry.

4.2 Subcontracting and wages: an empirical test

The approach adopted here reverses the logic of the explanation, since it involves assessing whether the hierarchy of subcontracting relations is reflected in wage levels. Consequently, we estimate the influence of an establishment's positions in the dependency relationship on wage levels in that establishment. This way of analysing the link between wages and subcontracting is used in a recent article by Berlinski (2008). This article examines the pay differential between workers in a firm and workers employed by a subcontracting firm who carry out the same task (two activities are investigated, namely cleaning and security). The pay differential that remains unexplained by the characteristics of the workers and firms turns out to be positive (more than 16%), which the author interprets as an indication that the use of subcontracting may serve to reduce the wages and benefit costs associated with the labour mobilised⁸.

Rather than examining the wage differentials between employees depending on the nature of the employment relationship linking them to the beneficiary of their labour, the econometric study presented here examines the wage differentials between establishments depending on their position in the economic dependency chain described above. Pairing the REPONSE survey with data from the 2005 annual social data declarations (DADS, Insee) provides us with the average and median wages paid in each establishment. The wages in question are the net hourly wages for the three skill levels investigated in this study: unskilled manual and white-collar workers, skilled manual and white-collar workers and highly skilled workers.

⁸ The author notes that this differential disappears, or is even reversed, in the case of the salaries paid to workers in the high-skill categories (engineers, computer scientists, technicians, etc.).

Table 5 shows the results of the estimation of the influence of the establishment's position in the hierarchy of subcontracting relations on the median hourly wage (log values) in the establishment for the three skill levels; a large set of structural variables is used for control purposes, including establishment characteristics, such as sector of activity, size and age of establishment, size of company as measured by turnover, the economic situation and workforce characteristics, such as the share of women and of employees under 30. The ordinary least squares method is used for the estimations.

The results show that the median hourly wage varies considerably depending on the establishment's position in the hierarchy of subcontracting relations. Employees' pay reflects the hierarchy of the productive system outlined earlier in the paper: it is lower in establishments that are pure subcontractors, somewhat higher in those that are both subcontractors and principal contractors and highest in those that are pure principal contractors. Moreover, the findings are significant for all three skill levels once establishment and workforce characteristics have been controlled for⁹. We can further note that the relation is particularly significant for unskilled workers whereas it is weaker for the highly skilled. More precisely, the median of the net hourly wages for unskilled workers is 9.4% higher in the pure principal contractors than in the pure subcontractor firms; it is also 7.5% higher for skilled workers and 6.4% higher for the very highly skilled.

Insert Table 5

5. Conclusion

Inter-firm relations are dominated by power relations. Since it leads principal contractors to plan subcontractors' activities and control the sale of their fragmented products,

⁹ The results are qualitatively the same if the variable to be explained is the average hourly rate rather than the median. The results are not reported here, but are available from the authors.

the use of subcontracting creates a hierarchical inter-firm division of labour and a chain of economic dependency. Firms may shift on to others the economic constraints to which they are subject by becoming principal contractors in their turn. The hierarchical inter-firm division of labour is part of the dominant firms' growth processes, which are linked to particular forms of the intra-firm division of labour.

The empirical tests carried out have shown, firstly, that firms that subcontract externalise execution tasks and, secondly, that wages fall as a firm's dependency increases. It might be thought that the field in which the present study was carried out has led to our results being underestimated. Firstly, it excludes small establishments with fewer than 20 employees, even though subcontracting affects them to an even greater degree. Secondly, it excludes subcontractor establishments located abroad, whereas studies of international subcontracting clearly reveal labour exploitation as a driving force (Epstein, 2006; Houseman, 2007). Finally, it takes no account of informal work, whereas sociological studies of subcontracting (Appay, 1998; Jounin, 2008) describe it as a key factor in the construction of inter-firm dependency relations.

These results provide empirical evidence to support the hypothesis that firms' position in subcontracting networks and their distance from the 'pure' principal contractors reflects the extent of their economic dependency. Our estimations do not constitute a test of the dependency hypothesis but they are coherent with the interpretation of the productive system in terms of power relations we propose. To develop the empirical study of such dependency relations it would be useful to view our results in the light of a study of the reduced profitability of subcontractors. We can indeed propose the hypothesis that the influence of principal contractors on their subcontractors entails pressures on their level of profitability, which in turn entails a strategy of minimising costs.

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Table 1: Proportion of establishments by dependency relations

		Being a subcontractor (SC)	
		Yes	No
Being a principal contractor (PC)	Yes	SC/PC : 15.2%	PC : 39.1%
	No	SC : 4.4%	Not SC or PC : 41.3%

Source: 2004-2005 REPONSE survey (DARES), DADS 2005 (INSEE).

Field: establishments of 20 and more employees in the private sector (excluding agricultural sector)

Table 2: Sectoral characteristics by dependency relations

	PC (in %)	PC-SC (in %)	SC (in %)	Not SC or PC (in %)	Total	Proportion of establishments in the database (%)
Sectors with a high proportion of PC						
Consumer goods industry	55	12.2	12.2	20.6	100	4
Automotive industry	84.8	9.3	0.4	5.5	100	0.4
Capital goods industry	54.9	26.1	6.5	12.5	100	5.7
Energy	67.4	9.1	7.1	16.4	100	1.7
Construction	64.7	22.1	3.9	9.3	100	8.6
Real-estate activities	43.2	13	0	43.8	100	1.1
Sectors with a high proportion of PC-SC and SC						
Intermediate goods industry	42.8	36.2	4.6	16.4	100	10.5
Transports	38.1	37.2	6.9	17.8	100	7.4
Business services	35	16.7	4.8	43.5	100	16.8
Sectors with few dependency relations						
Agro-food industry	26.4	5.9	6.5	61.2	100	3.2
Commerce	31.5	3.3	2	63.2	100	19.5
Financial activities	31.4	2.5	2.8	63.3	100	3.5
Personal and domestic services	23.8	4.6	0.2	71.4	100	7.7
Education, health and social services	31.1	3.8	4.3	60.8	100	9.4
Total	39.1	15.2	4.4	41.3	100	100

Source: 2004-2005 REPONSE survey (DARES), DADS 2005 (INSEE).

Field: establishments of 20 and more employees in the private sector (excluding agricultural sector)

Table 3: Size of establishments by dependency relations

	PC (in %)	PC-SC (in %)	SC (in %)	No SC or PC (in %)	Total	Proportion of establishments in the database (in %)
Less than 50	35.1	15.4	4.8	44.7	100	63.8
From 50 to 99	41.8	15	4	39.2	100	20.2
From 100 to 199	47.7	13.9	3.6	34.8	100	9.4
From 200 to 500	55.5	16.4	2.4	25.7	100	5.2
More than 500	66.1	12.6	2.7	18.6	100	1.4
Ensemble	39.1	15.2	4.4	41.3	100	100

Source: 2004-2005 REPONSE survey (DARES), DADS 2005 (INSEE).

Field: establishments of 20 and more employees in the private sector (excluding agricultural sector)

Table 4: Skill structure by level of inter-firm dependency (results of Tobit estimation)

	% of unskilled workers in the workforce			% of skilled workers in the workforce			% of highly skilled workers in the workforce		
Commercial relations									
Subcontractor	0.058	(0.032)	*	0.051	(0.025)	**	-0.105	(0.028)	***
Subcontractor and principal contractor	-0.012	(0.018)		0.034	(0.014)	**	-0.018	(0.016)	
Principal contractor	-0.028	(0.013)	**	0.012	(0.010)		0.015	(0.012)	
No commercial relation	ref			ref			ref		
Sector									
Agro-food industry	-0.073	(0.029)	**	0.192	(0.024)	***	-0.114	(0.027)	***
Consumer goods industry	-0.183	(0.027)	***	0.132	(0.021)	***	0.036	(0.025)	
Capital goods and automotive industries	-0.191	(0.024)	***	0.045	(0.019)	**	0.121	(0.022)	***
Intermediate goods industry / energy	-0.152	(0.021)	***	0.115	(0.017)	***	0.021	(0.019)	
Construction	-0.199	(0.029)	***	0.132	(0.022)	***	0.043	(0.026)	*
Transports	-0.262	(0.028)	***	0.335	(0.022)	***	-0.117	(0.025)	***
Commerce	ref			ref			ref		
Financial and real-estate activities	-0.391	(0.029)	***	-0.071	(0.021)	***	0.350	(0.024)	***
Business services	-0.207	(0.020)	***	-0.086	(0.016)	***	0.222	(0.018)	***
Personal and domestic services	-0.002	(0.029)		-0.135	(0.023)	***	0.110	(0.026)	***
Education, health, social services	-0.032	(0.028)		-0.144	(0.022)	***	0.171	(0.026)	***
Establishment size									
Less than 50 employees	ref			ref			ref		
From 50 to 99	0.046	(0.018)	**	-0.009	(0.014)		-0.015	(0.016)	
From 100 to 199	0.061	(0.018)	***	-0.031	(0.014)	**	-0.005	(0.016)	
From 200 to 499	0.109	(0.020)	***	-0.045	(0.015)	***	-0.021	(0.018)	
500 and more	0.066	(0.019)	***	-0.078	(0.015)	***	0.055	(0.017)	***
Age of establishment									
Less than 10 years	-0.023	(0.019)		-0.009	(0.014)		0.022	(0.016)	
10 to 50 years	ref			ref			ref		
More than 50 years	-0.019	(0.013)		0.040	(0.010)	***	-0.009	(0.012)	
Company turnover in €million									
Less than 5	ref			ref			ref		
5 to 10	-0.018	(0.023)		0.037	(0.018)	**	-0.006	(0.021)	
10 to 100	-0.021	(0.022)		0.013	(0.017)		0.013	(0.020)	
More than 100	-0.047	(0.023)	**	-0.027	(0.018)		0.055	(0.021)	***
Proportion of women									
Less than 15%	-0.022	(0.015)		0.127	(0.012)	***	-0.107	(0.013)	***
From 15% to 65%	ref			ref			ref		
More than 65%	0.179	(0.015)	***	-0.069	(0.012)	***	-0.099	(0.014)	***
Proportion of employees aged under 30									
Less than 12%	-0.031	(0.013)	**	-0.031	(0.010)	***	0.042	(0.012)	***
From 12 to 40%	ref			ref			ref		
More than 40%	0.156	(0.017)	***	-0.059	(0.013)	***	-0.094	(0.015)	***
Constant	0.263	(0.027)	***	0.351	(0.021)	***	0.349	(0.024)	***
Scale	0.270	0.004		0.215	0.003		0.248	0.003	
Number of observations	2732			2732			2732		
Number of censored observations	546			79			26		
Log Likelihood	-686.65			221.08			-103.16		

Source: 2004-2005 REPOSE survey (DARES), DADS 2005 (INSEE).

Field: establishments of 20 and more employees in the private sector (excluding agricultural sector)

Note: *, **, *** statistically significant at the 10%, 5%, 1% level. Standard errors in brackets.

Table 5: Median net hourly wage by level of inter-firm dependency (results of OLS estimation)

	Unskilled workers median wage			Skilled workers median wage			Highly skilled workers median wage		
Commercial relations									
Subcontractor	-0.071	(0.024)	***	-0.047	(0.019)	**	-0.048	(0.029)	*
Subcontractor and principal contractor	-0.046	(0.014)	***	-0.016	(0.011)		-0.038	(0.016)	**
Principal contractor	0.019	(0.010)	*	0.026	(0.008)	***	0.014	(0.012)	
No commercial relation	Ref			ref			ref		
Sector									
Agro-food industry	0.048	(0.021)	**	0.064	(0.018)	***	-0.022	(0.027)	
Consumer goods industry	0.041	(0.020)	**	0.108	(0.017)	***	0.041	(0.025)	
Capital goods and automotive industries	0.049	(0.018)	***	0.096	(0.015)	***	0.010	(0.022)	
Intermediate goods industry / energy	0.054	(0.016)	***	0.121	(0.013)	***	0.013	(0.020)	
Construction	0.012	(0.021)		0.127	(0.018)	***	0.132	(0.026)	***
Transports	0.039	(0.021)	*	0.058	(0.017)	***	0.038	(0.025)	
Commerce	Ref			ref			ref		
Financial and real-estate activities	0.065	(0.024)	***	0.091	(0.017)	***	0.076	(0.025)	***
Business services	0.011	(0.016)		0.072	(0.012)	***	0.101	(0.018)	***
Personal and domestic services	0.018	(0.021)		0.060	(0.019)	***	-0.010	(0.027)	***
Education, health, social services	0.013	(0.021)		0.017	(0.018)		-0.067	(0.026)	**
Establishment size									
Less than 50 employees	Ref			ref			ref		
From 50 to 100	-0.004	(0.014)		-0.011	(0.011)		-0.050	(0.016)	***
From 100 to 200	-0.003	(0.014)		-0.010	(0.011)		-0.021	(0.016)	
From 200 to 500	0.043	(0.015)	***	0.025	(0.012)	**	-0.019	(0.018)	
500 and more	0.104	(0.015)	***	0.090	(0.012)	***	0.092	(0.018)	***
Age of establishment									
Less than 10 years	0.002	(0.014)		-0.003	(0.011)		-0.022	(0.017)	
10 to 50 years	ref			ref			ref		
More than 50 years	0.022	(0.009)	**	0.019	(0.008)	**	0.002	(0.012)	
Company turnover in €million									
Less than 5	ref			ref			ref		
5 to 10	0.019	(0.017)		-0.008	(0.014)		0.050	(0.021)	**
10 to 100	0.024	(0.017)		0.012	(0.014)		0.064	(0.020)	***
More than 100	0.075	(0.017)	***	0.077	(0.014)	***	0.096	(0.021)	***
State of the market									
Growing	-0.001	(0.009)		-0.004	(0.007)		-0.044	(0.011)	***
Stable	ref			ref			ref		
Declining	0.003	(0.012)		-0.000	(0.010)		-0.016	(0.015)	
Difficulty in predicting demand	-0.0375	(0.009)	***	-0.037	(0.007)	***	-0.008	(0.011)	
Proportion of women									
Less than 15%	0.031	(0.011)	***	0.013	(0.009)		-0.024	(0.014)	*
From 15% to 65%	ref			ref			ref		
More than 65%	-0.028	(0.011)	**	-0.020	(0.009)	**	-0.031	(0.014)	**
Proportion of employees aged under 30									
Less than 12%	0.053	(0.010)	***	0.051	(0.008)	***	0.063	(0.012)	***
From 12 to 40%	ref			ref			ref		
More than 40%	-0.054	(0.012)	***	-0.052	(0.010)	***	-0.026	(0.015)	*
Constant	2.0392	(0.022)	***	2.136	(0.018)	***	2.603	(0.027)	***
Number of observations	2143			2599			2653		
Adj R2	0.2413			0.3117			0.1539		

Source: 2004-2005 REPOSE survey (DARES), DADS 2005 (INSEE).

Field: establishments of 20 and more employees in the private sector (excluding agricultural sector)

Note: *, **, *** statistically significant at the 10%, 5%, 1% level. Standard errors in brackets.